

CAZON
EV
1976
M55

1976

MODEL MUNICIPAL NOISE CONTROL BY-LAW

Revised May, 1976



Ontario

Ministry
of the
Environment

The Honourable
George A. Kerr, Q.C.,
Minister

Everett Biggs,
Deputy Minister

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MODEL
MUNICIPAL
NOISE CONTROL
BY-LAW

REVISED MAY, 1976

FURTHER INFORMATION ON THE
PUBLICATIONS MAY BE OBTAINED BY
WRITING TO:

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INTRODUCTION

In 1971, when sound and vibration were defined as contaminants under The Environmental Protection Act, 1971, the Ministry of the Environment initiated studies of environmental noise and noise control. It was generally recognized that the federal, provincial and municipal governments would each have a role to play in an effective noise control program. During the past years, this Ministry has been intensively studying the noise control programs of other governments, the sources and characteristics of noise which give rise to complaints, methods of abating noise, variations of noise levels in various community settings and associated technical aspects of noise and noise measurement.

While there was an apparent desire on the part of many municipalities in Ontario to adopt noise control by-laws to meet municipal needs, the authority under The Ontario Municipal Act for such by-laws was too narrow to permit adequate scope. It was evident that many of the common sounds and vibrations giving rise to noise complaints were of a local community nature and could be effectively controlled at the municipal level. Accordingly, in the Fall of 1974, the Honourable William G. Newman, who preceded the Honourable George A. Kerr as the Minister of the Environment, announced that he would provide municipalities with a model noise control by-law and with adequate permissive legislative authority under The Environmental Protection Act to adopt such a by-law. The necessary amendment to the Environmental Protection Act has been passed by the Legislature and came into force by proclamation of the Lieutenant Governor on October 8, 1975.

This amendment permits the councils of local municipalities, that is, cities, towns, villages, and townships, to pass noise control by-laws, subject to the approval of the Minister of the Environment.

The original format, that of a model by-law with a number of supporting publications, is retained so as to facilitate record-keeping and on-going development. A by-law in final form for adoption by a municipality will incorporate those essential publications in the by-law, either in the text itself or as schedules to the by-

law. In order to incorporate technological advances, or to broaden the scope of the publications, revisions of the model municipal noise control by-law will be prepared from time to time so that a municipality wishing to incorporate such changes will need only to readopt the revised model by-law.

It is intended that the by-law meet the requirements of municipalities of all sizes, provide comprehensive control for most known sound and vibration problems, permit flexibility to meet local needs and resources, and provide a unifying base for noise control across the Province. The prerogative for approval of a municipal noise control by-law is assigned to the Minister by the legislation.

A summary of the revised model municipal noise control by-law is provided for reference:

1. The by-law will permit a municipal Council to exercise broad environmental noise control at the local level under the powers granted by The Environmental Protection Amendment Act, 1974 (No.2).
2. Proper enforcement of a municipal noise control by-law will require the appointment of a noise control officer whose duties may include the following:
 - i) conduct investigations of noise complaints, including the monitoring of sound levels.
 - ii) publicize noise abatement.
 - iii) develop administrative procedures to provide effective enforcement of the by-law.
 - iv) provide Council with such advice as it requires.
3. The by-law may:
 - (i) prohibit sounds from squealing tires, faulty mufflers, racing, and unwarranted idling.
 - (ii) limit some noisy activities in sensitive areas to certain times of the day, for instance the operation of auditory signalling devices and loudspeakers, shouting, animal noises, loading and delivery, construction, discharge of firearms.

- (iii) limit sound levels from certain sources such as, air conditioners, lawnmowers, or motorized conveyances according to specific sound emission standards.
 - (iv) specify maximum noise levels for stationary sources on the basis of the equivalent sound level (L_{eq}), received at a residence.
4. The by-law may permit Council to exempt certain traditional activities and provide for other special circumstances.

Enforcement of a quantitative noise by-law is complicated. The accurate measurement of sound is a complex problem particularly when attempting to satisfy legal requirements. In order to successfully prosecute in Court a case based on a quantitative noise control by-law, it is essential that the instrumentation and the measurement procedures used, rigorously conform to the requirements of the Noise Pollution Control Publications published by the Ministry of the Environment. It must be conclusively demonstrated to the Court that the measurements given in evidence are accurate, reliable and within the tolerances specified. The Publications represent some of the most advanced procedures and instrumentation standards in the field of acoustics. These are set out in a logical and relatively simple fashion. Faithful observance of all of the provisions of the Publications will help to convince the Court of the validity of the evidence.

The Minister is prepared to assist all municipalities in the adoption and implementation of the by-law, or parts thereof, and particularly, to assist with the technical training of personnel in sound and vibration measurement and enforcement procedures.

BILL 190

4TH SESSION, 29TH LEGISLATURE, ONTARIO
23 ELIZABETH II, 1974

**An Act to amend
The Environmental Protection Act, 1971**

THE HON. W. NEWMAN
Minister of the Environment

1st Reading

January 28th, 1975

2nd Reading

February 3rd, 1975

3rd Reading

February 6th, 1975

Proclaimed October 8th, 1975.

S.O. 1974, c. 125

TORONTO

PRINTED BY J. C. THATCHER, QUEEN'S PRINTER FOR ONTARIO

**An Act to amend
The Environmental Protection Act, 1971**

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. Subsection 1 of section 1 of *The Environmental Protection Act, 1971*, being chapter 86, as amended by the Statutes of Ontario, 1972, chapter 1, section 69 and 1972, chapter 106, section 1, is further amended by adding thereto the following clause:

(fa) "local municipality" means a city, town, village or township.

2. Subsection 1 of section 95 of the said Act is repealed and the following substituted therefor:

(1) Any regulation may be general or particular in its application, may be limited as to time or place or both and may exclude any place from the application of the regulation.

3. The said Act is amended by adding thereto the following section:

95a.—(1) The councils of local municipalities may, subject to the approval of the Minister, pass by-laws,

- (a) regulating or prohibiting the emission of sounds or vibrations;
- (b) providing for the licensing of persons, equipment and premises, or any of them, with respect to the emission of sounds or vibrations;
- (c) prescribing maximum permissible levels of sounds or vibrations that may be emitted;

- (d) prescribing procedures for determining the levels of sounds or vibrations that are emitted,

and such a by-law may make different provisions for different areas of a local municipality and may make provision for exempting any person, equipment or premises from any provision of the by-law for such period of time and subject to such terms and conditions as may be set out or provided for in the by-law.

Adoption
of codes in
by-laws

(2) A by-law passed by the council of a local municipality pursuant to subsection 1 may adopt by reference, in whole or in part, with such changes as the council considers necessary, any code, formula, standard or procedure, and may require compliance with any code, standard or procedure so adopted.

Application
of
R.S.O. 1970,
c. 284

(3) Part XXI of *The Municipal Act* applies to by-laws passed under this section.

s. 96,
amended

4. Section 96 of the said Act is amended by adding thereto the following subsection:

Idem

(2) Subsection 1 does not apply in respect of section 95a and the enactment of section 95a or a by-law pursuant to section 95a does not affect the validity of an Act that is in force immediately before the coming into force of section 95a.

Commence-
ment

5. This Act comes into force on a day to be named by proclamation of the Lieutenant Governor. (October 8, 1975)

Short title

6. This Act may be cited as *The Environmental Protection Amendment Act, 1974* (No. 2).

A BY-LAW TO CONTROL NOISE

By-Law No. _____

A By-law of the Corporation of

WHEREAS it is expedient to exercise the power conferred upon the Council by The Environmental Protection Act, 1971, as amended, and other statutory authority; and

WHEREAS a recognized body of scientific and technological knowledge exists by which sound and vibration may be substantially reduced; and

WHEREAS the people have a right to and should be ensured an environment free from unusual, unnecessary, or excessive noise or vibration which may degrade the quality and tranquillity of their life or cause nuisance; and

WHEREAS it is the policy of the Council to reduce and control such noise or vibration;

NOW THEREFORE, the Council of the Corporation of

enacts as follows:

1. Interpretation

(1) Technical Terms

In this By-Law,

all the words which are of a technical nature and are related to sound or vibration shall, for the purpose of this By-Law, have the meanings specified for them in Publication NPC-101 - Technical Definitions.

(2) Definition

In this By-Law,

(a) Certificate

"Certificate" means a Certificate of Competency in Environmental Acoustics Technology of a specified class issued by the Minister of the Environment;

(b) Construction

"construction" includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, moving, land clearing, earth moving, grading, excavating, the laying of pipe and conduit whether above or below ground level, street and highway building, concreting, equipment installation and alteration and the structural installation of construction components and materials in any form or for any purpose, and includes any work in connection therewith;

(c) Construction Equipment

"construction equipment" means any equipment or device designed and intended for use in construction, or material handling, including but not limited to, air compressors, pile drivers, pneumatic or hydraulic tools, bulldozers,

tractors, excavators, trenchers, cranes, derricks, loaders, scrapers, pavers, generators, off-highway haulers or trucks, ditchers, compactors and rollers, pumps, concrete mixers, graders, or other material handling equipment;

(d) Conveyance

"conveyance" includes a vehicle and any other device employed to transport a person or persons or goods from place to place but does not include any such device or vehicle if operated only within a building;

(e) Council

"Council" means the Council of the Corporation of the Municipality of _____;

(f) Highway

"highway" includes a common and public highway, street, avenue, parkway, driveway, square, place, bridge, viaduct or trestle designed and intended for, or used by, the general public for the passage of vehicles;

(g) Minister

"Minister" means Minister of the Environment;

(h) Ministry

"Ministry" means Ministry of the Environment;

(i) Motor Vehicle

"motor vehicle" includes an automobile, motorcycle, and any other vehicle propelled or driven otherwise than by muscular power; but does not include the cars of electric or steam railways, or other motor vehicle running only upon rails, or a motorized snow vehicle, traction engine, farm tractor, self-propelled implement of husbandry or road-building machine within the meaning of The Highway Traffic Act;

(j) Motorized Conveyance

"motorized conveyance" means a conveyance propelled or driven otherwise than by muscular, gravitational or wind power;

(k) Municipality

"municipality" means the land within the geographic limit of the Municipality of _____;

(l) Noise

"noise" means unwanted sound;

(m) Noise Control Officer

"Noise Control Officer" means a person designated by Council as responsible for the administration of this By-Law, who shall possess a valid Certificate;

(n) Point of Reception

"point of reception" means any point on the premises of a person where sound or vibration originating from other than those premises is received;

(o) Publication

"Publication" means a specified publication of the Noise Pollution Control Section of the Pollution Control Branch of the Ministry of the Environment, which is listed in Schedule 1 hereto;

(p) Quiet Zone

"Quiet Zone" means an area of the municipality so designated by Council in this by-law as a place where quiet is of a particular importance, such as, but not limited to, the immediate vicinity of hospitals, convalescent homes or retirement homes;

(q) Stationary Source

"stationary source" means a source of sound which does not normally move from place to place and includes the premises of a person as one stationary source, unless the dominant source of sound on those premises is construction equipment or a conveyance.

2. Prohibitions

No person shall emit or cause or permit the emission of sound resulting from an act listed in Schedule 2 - General Prohibitions, and which sound is clearly audible at a point of reception.

3. Limitations by Time and Place

No person shall emit or cause or permit the emission of a sound resulting from any act listed in Schedule 3 - Prohibitions by Time and Place, if clearly audible at a point of reception located in an area of the Municipality specified in Schedule 3 within a prohibited time shown for such an area.

4. General Limitations on Sound Levels at a Point of Reception due to Stationary Sources

- (1) No person shall emit or cause or permit the emission of sound from a stationary source such that the one hour equivalent sound level (L_{eq}) of resultant sound received at a residential point of reception, measured in accordance with Publication NPC-103 - Procedures, as adjusted in accordance with Publication NPC-120 - Sound Level Adjustments, exceeds by 6 dBA or more, the one hour equivalent sound level (L_{eq}) caused by ground transportation as estimated for that point of reception and that time of day, pursuant to Publication NPC-129 - Estimating Sound Levels from Ground Transportation, or by other techniques at least as accurate as those set out in Publication NPC-129.

(2) Impulsive Sound

No person shall emit or cause or permit the emission of sound of an impulsive nature from a stationary source such that it results in an impulse sound level at a point of reception in excess of the applicable impulse sound level limit specified in Publication NPC-124 - Impulsive Sound.

5. Limitation on Sound and Vibration Levels at a Point of Reception for Specific Sources

(1) Residential Central Air Conditioners

No person shall emit or cause or permit the emission of sound from the operation of a residential central air conditioning device including, but not limited to, split central, unitary central and heat pump installations, resulting in a sound level at a point of reception in excess of the applicable sound level limit set out in Publication NPC-116 - Residential Air Conditioners.

(2) Blasting Operations

No person shall emit or cause or permit the emission of sound (concussion) or vibration from a blasting operation of a type mentioned in Publication NPC-119 - Blasting, such that the peak overpressure level or peak vibration velocity at a point of reception exceeds the appropriate limit set out in Publication NPC-119 - Blasting.

6. Preemption

Where a source of sound is subject to both Sections 4 and 5, the less restrictive provisions shall prevail.

7. Sound Emission Standards

(1) Construction Equipment - Residential Areas

No person shall emit or cause or permit the emission of any sound from any item of construction equipment of a type referred to in Publication NPC-115 - Construction Equipment, at a work site, any part of which is located within 600 m of premises which are normally used for residential purposes or for the keeping of animals or within 600 m of a Quiet Zone, unless;

- (a) the item of equipment bears a label affixed by the manufacturer or distributor which states, the year of manufacture and that the item of equipment complies with the residential sound emission standard set out in Publication NPC-115 - Construction Equipment, as applicable to that type of equipment and date of manufacture; or
- (b) the item of equipment was put into use prior to January 1st, 1978; or
- (c) the owner, operator, manufacturer or distributor provides proof that the item of equipment complies with the residential sound emission standard set out in Publication NPC-115 - Construction Equipment, as applicable to that type of equipment and date of manufacture.

(2) Construction Equipment - Quiet Zones

No person shall emit or cause or permit the emission of any sound from any item of construction equipment of a type referred to in Publication NPC-115 - Construction Equipment, at a work site, any part of which is located in a Quiet Zone, unless:

- (a) the item of equipment bears a label affixed by the manufacturer or distributor which states the year of manufacture and that the item of equipment complies with the Quiet Zone sound emission standard set out in Publication NPC-115 - Construction Equipment as applicable to that type of equipment and date of manufacture; or
- (b) the owner, operator, manufacturer or distributor provides proof that the item of equipment complies with the Quiet Zone sound emission standard set out in Publication NPC-115 - Construction Equipment, as applicable to that type of equipment and date of manufacture.

(3) Domestic Outdoor Power Tools

No person shall emit or cause or permit the emission of any sound from any domestic outdoor power tool of a type referred to in Publication NPC-117 - Domestic Outdoor Power Tools, which device is powered by an electric motor or an internal combustion engine unless:

- (a) the device bears a label affixed by the manufacturer or distributor which states, the year of manufacture and that the device complies with the sound emission standard set out in Publication NPC-117 - Domestic Outdoor Power Tools, as applicable to that type of device and date of manufacture; or
- (b) the device was put into use prior to January 1st, 1978;
or

- (c) the owner, operator, manufacturer or distributor provides proof that the device complies with the sound emission standard set out in Publication NPC-117 - Domestic Outdoor Power Tools, as applicable to that type of device and date of manufacture.

(4) Window Air Conditioners

No person shall emit or cause or permit the emission of any sound from any window or through-the-wall air conditioner of a type referred to in Publication NPC-116 - Residential Air Conditioners unless:

- (a) The air conditioner bears a label affixed by the manufacturer or distributor which states, the year of manufacture and that the device complies with the sound emission standard set out in Publication NPC-116 - Residential Air Conditioners as applicable to that type of air conditioner and date of manufacture; or
- (b) the device was put into use prior to January 1st, 1978, or
- (c) the owner, operator, manufacturer or distributor, provides proof that the device complies with the sound emission standard set out in Publication NPC-116 - Residential Air Conditioners, as applicable to that type of air conditioner and date of manufacture.

(5) Motorized Conveyances

No person shall emit or cause or permit the emission of any sound from any motorized conveyance of a type referred to in Publication NPC-118 - Motorized Conveyances unless the motorized conveyance complies with the sound emission standard set out in Publication NPC-118 - Motorized Conveyances, as applicable to that type of motorized conveyance and date of manufacture.

8. Exemption

Public Safety

Notwithstanding any other provision of this by-law, it shall be lawful during an emergency to emit or cause or permit the emission of sound or vibration in connection with emergency measures:

- (a) for the immediate health, safety or welfare of the inhabitants or any of them; or,
 - (b) for the preservation or restoration of property;
- unless such sound or vibration is clearly of a longer duration, or nature more disturbing, than is reasonably necessary for the accomplishment of such emergency purpose.

9. Grant of Exemption by Council

(1) Application to Council

Notwithstanding anything contained in this by-law, any person may make application to Council to be granted an exemption from any of the provisions of this by-law with respect to any source of sound or vibration for which he might be prosecuted and Council, by resolution, may refuse to grant any exemption or may grant the exemption applied for or any exemption of lesser effect and any exemption granted shall specify the time period during which it is effective and may contain such terms and conditions as Council sees fit.

(2) Details of Application for Exemption

The application mentioned in subsection (1) shall be made in writing, in duplicate, and shall contain:

- (a) the name and address of the applicant,
- (b) a description of the source of sound or vibration in respect of which exemption is sought,

- (c) a statement of the particular provision or provisions of the by-law from which exemption is sought,
- (d) the period of time, of a duration not in excess of six months, for which the exemption is sought,
- (e) the reasons why the exemption should be granted,
- (f) a statement of the steps, if any, planned or presently being taken to bring about compliance with the by-law, and
- (g) proof of publication within the preceding ten days, in a newspaper of general circulation within the Municipality, of a notice of intention to apply for an exemption to this by-law, containing the information required by clauses (a) through (e) hereof, and further stating the date upon which it is intended that application will be made to Council.

Note

The Environmental Protection Act, 1971, C.86, S.102(2); states:

Notwithstanding subsection 1, a person to whom an order or program approval of the Minister or the Director is directed who complies fully with the order or approval shall not be prosecuted for or convicted of an offence in respect of the matter or matters dealt with in the order or approval that occurs during the period within which the order or program approval is applicable.

(3) Noise Control Officer

Council shall cause one copy of the application for exemption to be delivered to the Noise Control Officer and he shall prepare a report to Council forthwith, stating his opinion of the merits of the application and his recommendations as to terms and conditions which, in his opinion, should be imposed upon the applicant if the exemption is granted and Council will not consider the application for exemption until it has received the report of the Noise Control Officer.

(4) Report

The Noise Control Officer shall forward a copy of his report to the applicant at the address shown on the application by prepaid registered mail and shall, not sooner than two weeks after the mailing of the report to the applicant, submit the report to Council and shall, on request, make his report available for public inspection.

(5) Decision

In deciding whether to grant the exemption, Council shall consider the application, the report of the Noise Control Officer, and any written submission then received by Council and made by the applicant after receipt of the report of the Noise Control Officer and the Council may consider such other matters as it sees fit.

(6) Breach

Breach by the applicant of any of the terms or conditions of the exemption shall render the exemption null and void.

10. Exemption of Traditional, Festive or Religious Activities

Notwithstanding any other provision of this by-law, this by-law does not apply to a person who emits or causes or permits the emission of sound or vibration in connection with any of the traditional, festive, religious and other activities listed in Schedule 4.

11. Severability

If a court of competent jurisdiction should declare any section or part of a section of this by-law to be invalid, such section or part of a section shall not be construed as having persuaded or influenced Council to pass the remainder of the by-law and it is hereby declared that the remainder of the by-law shall be valid and shall remain in force.

12. Penalty

Every person who contravenes any of the provisions of this by-law is guilty of an offence and shall, upon conviction thereof, forfeit and pay a penalty of not less than \$50.00 nor more than \$1,000.00 for a first offence and not less than \$100.00 and not more than \$1,000.00 for a second or subsequent offence, exclusive of costs and every such fine is recoverable under The Summary Convictions Act.

SCHEDULE 1

Publications

<u>NUMBER</u>	<u>TITLE</u>
NPC-100	Assembly and Approval of By-law
NPC-101	Technical Definitions
NPC-102	Certificates
NPC-103	Procedures
NPC-104	
NPC-105	
NPC-106	Building Acoustical Insulation
NPC-107	
NPC-108	
NPC-109	
NPC-110	
NPC-111	
NPC-112	Instrumentation
NPC-113	Construction Sound Control Devices
NPC-114	
NPC-115	Construction Equipment
NPC-116	Residential Air Conditioners
NPC-117	Domestic Outdoor Power Tools
NPC-118	Motorized Conveyances
NPC-119	Blasting
NPC-120	Sound Level Adjustments
NPC-121	Sound Within Buildings
NPC-122	
NPC-123	
NPC-124	Impulsive Sound
NPC-125	Guidelines on Duties of Noise Control Officer
NPC-126	Guidelines on Aircraft Noise
NPC-127	Guidelines for Low Frequency Sound and Vibration
NPC-128	

NUMBERS

TITLE

NPC-129	Estimating Sound Levels From Ground Transportation
NPC-130	Guidelines for Transportation Noise
NPC-131	Guidelines for Noise Control in Land Use Planning
NPC-132	Guidelines for Tire Noise

SCHEDULE 2

General Prohibitions

1. Racing of any motorized conveyance other than in a racing event regulated by law.
2. The operation of a motor vehicle in such a way that the tires squeal.
3. The operation of any combustion engine without an effective exhaust muffling device in good working order and in constant operation.
4. The operation of a vehicle or a vehicle with a trailer resulting in banging, clanking, squealing or other like sounds due to improperly secured load or equipment, or inadequate maintenance.
5. The operation of an engine or motor in, or on, any motor vehicle or of attached auxiliary equipment for a continuous period exceeding five minutes, while such vehicle is stationary in a residential area as designated in the zoning by-law No. _____ unless:
 - (i) the vehicle is in an enclosed structure constructed so as to effectively prevent excessive noise emission; or
 - (ii) the original equipment manufacturer specifically recommends a longer idling period for normal and efficient operation of the motor vehicle in which case such recommended period shall not be exceeded; or
 - (iii) operation of such engine or motor is essential to a basic function of the vehicle or equipment, including but not limited to, operation of ready-mixed concrete trucks, lift platforms or refuse compactors and heat exchange systems, or
 - (iv) weather conditions justify the use of heating or refrigerating systems powered by the motor or engine for the safety and welfare of the operator, passengers or animals, or the preservation of perishable cargo; or

- (v) prevailing low temperatures make longer idling periods necessary, immediately after starting the motor or engine; or
 - (vi) the idling is for the purpose of cleaning and flushing the radiator and associated circulation system for seasonal change of antifreeze, cleaning of the fuel system, carburetor or the like, when such work is performed other than for profit.
6. The operation of a motor vehicle horn or other warning device except where required or authorized by law.
 7. The operation of any item of construction equipment in a Quiet Zone without effective muffling devices in good working order and in constant operation.

SCHEDULE 3

Prohibitions by Time and Place

	Prohibited Period of Time	
	Quiet Zone	Residential Area
1. The operation of any auditory signaling device, including but not limited to the ringing of bells or gongs and the blowing of horns or sirens or whistles, or the production, reproduction or amplification of any similar sounds by electronic means except where required or authorized by law.	At any time	B & D
2. The operation of any electronic device or group of connected electronic devices incorporating one or more loudspeakers or other electro-mechanical transducers, and intended for the production, reproduction or amplification of sound.	At any time	C
3. All selling or advertising by shouting or outcry or amplified sound.	At any time	B & D
4. Loading, unloading, delivering, packing, unpacking, or otherwise handling any containers, products, materials, or refuse, whatsoever, unless necessary for the maintenance of essential services.	B	B & D
5. The operation of any construction equipment in connection with construction.	E & D	F & D
6. The detonation of fireworks or explosive devices.	At any time	A
7. The discharge of firearms.	At any time	At any time
8. The operation of a combustion engine which, (i) is, (ii) is used in, or (iii) is intended for use in, a toy or a model or replica of a larger device, which model or replica has no function other than amusement and which is not a conveyance.	At any time	B

Cont'd....

Schedule 3 - cont'd...

9. The operation of any powered rail car including but not limited to refrigeration cars, locomotives or self-propelled passenger cars, while stationary on property not owned or controlled by a railway governed by the Canada Railway Act.	At any time	A
10. The operation of any motorized conveyance other than on a highway or other place intended for its operation.	At any time	B
11. The venting, release or pressure relief of air, steam or other gaseous material, product or compound from any autoclave, boiler, pressure vessel, pipe, valve, machine, device or system.	At any time	A
12. Persistent barking or whining of any domestic dog or other persistent noise making by any domestic pet.	At any time	A
13. The operation of any powered or non-powered tool for domestic purposes other than snow removal.	C	B
14. The operation of solid waste bulk lift or refuse compacting equipment.	C	B
15. The operation of commercial car wash equipment.	C	A
16. Yelling, shouting, hooting, whistling or singing.	At any time	A

Restricted Times:

- A - 23:00 Hrs. of one day to 07:00 Hrs. next day (09:00 Hrs. Sundays)
- B - 19:00 Hrs. of one day to 07:00 Hrs. next day (09:00 Hrs. Sundays)
- C - 17:00 Hrs. of one day to 07:00 Hrs. next day (09:00 Hrs. Sundays)
- D - All day Sundays and Statutory Holidays.
- E - 17:00 Hrs. of one day to 07:00 Hrs. next day
- F - 19:00 Hrs. of one day to 07:00 Hrs. next day

SCHEDULE 4

Activities to Which the By-Law Does Not Apply

A list of sources (activities) shall constitute this Schedule and shall specify those activities which Council considers should be exempt from the provisions of the By-Law because of their traditional, festive, religious or other nature.

READ A FIRST AND SECOND TIME this day of , 197 .

READ A THIRD TIME AND FINALLY PASSED this day of , 197 .

Clerk

I hereby certify the foregoing to be a
complete and true copy of By-law No. ,

Clerk

This By-law is approved pursuant to the provisions of
The Environmental Protection Act, 1971, as amended,
at Toronto, this day of , 197 .

Minister of the Environment

NOISE

POLLUTION

CONTROL

PUBLICATIONS

Revised May, 1976

Publication NPC-100Assembly and Approval of By-Law1. Scope

A noise control by-law passed by a municipal Council pursuant to Section 95 of the Environmental Protection Act, 1971, requires the approval of the Minister. This Publication describes how such a by-law may be assembled and how this approval may be obtained.

2. Assembly from Model By-Law

For the assistance of municipalities, a Model Municipal Noise Control By-Law has been prepared by the Ministry. Council may adopt the Model By-Law in whole, or in part so that it may best meet the particular requirements of the municipality. Three suggested formats are presented as follows:

OPTION 1 - Qualitative By-Law

This by-law would incorporate sections 1 through 3 together with sections 8 through 12 of the Model By-Law and would represent a comprehensive form of qualitative noise control by-law suited for adoption by small communities in the Province.

OPTION 2 - Qualitative and Limited Quantitative By-Law

This by-law would incorporate sections 1 through 3 and sections 8 through 12 as above and, in addition, a selection from sections 4, 5, 6 and 7 of the Model By-Law.

This will generally require trained personnel, in possession of a valid Certificate of Competency in Environmental Acoustics Technology, for enforcement of the quantitative aspects.

OPTION 3 - Comprehensive By-Law

A by-law which includes the entire Model By-Law will provide for control of noise and vibration of most types.

The municipality may find different selections of parts of the Model By-Law more suitable for their purposes. The Council has the option of drafting new or varied sections for incorporation with sections of the Model By-Law or of drafting a completely independent by-law.

3. Required Format

When assembling a by-law from sections of the Model By-Law, the following provisions apply:

- (a) Section 1 and Schedule 1 must be included without change.
- (b) A selection from sections 2 through 7, and the appropriate schedules, must be made and no significant change in wording will be permitted. Section 6 must be included if both subsections 4(1) and 5(1) or both subsections 4(2) and 5(2) are selected.
- (c) The by-law must include section 8 of the Model By-Law or some suitable variation.
- (d) Sections 9 and 10 of the Model By-Law are optional as to inclusion and to precise wording.
- (e) The by-law must include sections 11 and 12 of the Model By-Law or some suitable variation.

Observance of the above provisions may expedite approval by the Minister, of a noise control by-law.

4. Presentation for Approval

Preparation of a noise control by-law should be undertaken in consultation with the Ministry and a by-law should not be submitted to the Minister for approval until it has been passed by Council or is in a form which is likely to be passed by Council without change.

Two copies of the by-law shall be forwarded to the Minister for approval. If these are not certified copies of a by-law already

passed by Council, it is requested that when the approved by-law is passed, a certified copy be returned to the Minister for record purposes.

5. Amendments or Repeal

Every amendment or repeal of a noise control by-law passed pursuant to the Environmental Protection Act, 1971, also requires the approval of the Minister.

Publication NPC-101Technical Definitions1. Technical Terminology and Standards

The following definitions and standards shall be used for the purposes of Municipal Noise By-Laws enacted pursuant to The Environmental Protection Act and all Publications of the Noise Pollution Control Section of the Pollution Control Planning Branch of the Ministry of the Environment and the definition of any technical word used in such By-Law or this or any such Publication and not herein defined shall be the definition appearing in the applicable Publication of the Canadian Standards Association (CSA), the American National Standards Institute (ANSI), the International Organization for Standardization (ISO), the International Electro-Technical Commission (IEC), the Society of Automotive Engineers (SAE), or the Machinery and Equipment Manufacturers Association of Canada (MEMAC):

(1) Acoustic Calibrator

An "Acoustic Calibrator" is an electro-mechanical or mechanical device intended for the calibration of sound level meters and meeting the applicable specifications of Publication NPC-112 - Instrumentation for Acoustic Calibrators.

(2) A-weighting

"A-weighting" is the frequency weighting characteristic as specified in IEC 123 or IEC 179 and intended to approximate the relative sensitivity of the normal human ear to different frequencies (itches) of sound.

(3) A-weighted Sound Pressure Level

The "A-weighted sound pressure level" is the sound pressure level modified by application of the A-weighting. It is measured in A-weighted decibels, denoted dBA.

(4) Beating

"Beating" is the characteristic of a sound which has an audible cyclically varying sound level, caused by the interaction of two sounds of almost the same frequency.

(5) Decibel

The "decibel" is a dimensionless measure of sound level or sound pressure level; see sound pressure level.

(6) Effective Sound Pressure

The "effective sound pressure" at a point is the root-mean square value of the instantaneous sound pressure, over a time interval, at the point under consideration as detected with a sound level meter meeting the requirements of Publication NPC-112 - Instrumentation.

(7) Equivalent Sound Level

The "equivalent sound level" sometimes denoted L_{eq} , is the value of the constant sound level which would result in exposure to the same total A-weighted energy as would the specified time-varying sound, if the constant sound level persisted over an equal time interval. It is measured in dBA.

(8) Fast Response

"Fast response" is a dynamic characteristic setting of a sound level meter or other reading device meeting the applicable specifications of Publication NPC-112 - Instrumentation.

(9) Frequency

The "frequency" of a periodic quantity is the number of times that the quantity repeats itself in a unit interval of time, It is measured in hertz (Hz) which is the same as cycles per second.

(10) General Purpose Sound Level Meter

A "General Purpose Sound Level Meter" is a sound level meter which meets the specifications of Publication NPC-112 - Instrumentation for General Purpose Sound Level Meters.

(11) Impulse Response

"Impulse response" is a dynamic characteristic setting of a sound level meter meeting the applicable specifications of Publication IEC 179A, First supplement to IEC 179, as designated in Publication NPC-112 - Instrumentation for an Impulse Sound Level Meter.

(12) Impulsive Sound

An "impulsive sound" is a single pressure pulse or a single burst of pressure pulses, as defined by IEC 179A, First supplement to IEC 179, Sections 3.1 and 3.2.

(13) Impulse Sound Level

The "impulse sound level" is the sound level of an impulsive sound as measured with an Impulse Sound Level Meter set to impulse response. It is measured in A-weighted decibels, denoted dBAI.

(14) Impulse Sound Level Meter

An "Impulse Sound Level Meter" is a sound level meter which meets the specifications of Publication NPC-112 - Instrumentation, for Impulse Sound Level Meters.

(15) Integrating Sound Level Meter

An "Integrating Sound Level Meter" is a sound level meter which is capable of being used in deriving the equivalent sound level (L_{eq}) and which meets the applicable specifications of Publication NPC-112 - Instrumentation.

(16) Linear (Flat) Response

"Linear response" or "flat response" is the frequency response of a sound level meter, meeting the applicable specification of Publication NPC-112 - Instrumentation.

(17) Overpressure

The "overpressure" at a point due to an acoustic disturbance is the instantaneous difference at that point between the atmospheric pressure during the disturbance and the prevailing atmospheric pressure in the absence of the disturbance. The unit of measurement is the pascal. One pascal, abbreviated Pa, is the same as one newton per square metre, abbreviated N/m^2 .

(18) Overpressure Level

The "overpressure level" is twenty times the logarithm to the base 10 of the ratio of the overpressure to the reference pressure of 20 μPa .

(19) Peak Particle Velocity

The "peak particle velocity" is the maximum instantaneous velocity experienced by the particles of a medium when set into transient vibratory motion. This can be derived as the magnitude of the vector sum of three orthogonal components and is measured in cm/s.

(20) Peak Pressure Level Detector

A "Peak Pressure Level Detector" is a device capable of measuring peak pressure or pressure level perturbations in air and which meets the applicable specifications of Publication NPC-112 - Instrumentation, for Peak Pressure Level Detectors.

(21) Percentile Sound Level

The "x percentile sound level", designated L_x , is the sound level exceeded x percent of a specified time period. It is measured in dBA.

(22) Slow Response

"Slow response" is a dynamic characteristic setting of a sound level meter or other reading device meeting the applicable specifications of Publication NPC-112 - Instrumentation.

(23) Sound

"Sound" is an oscillation in pressure, stress, particle displacement or particle velocity, in a medium with internal forces (e.g. elastic, viscous), or the superposition of such propagated oscillations, which may cause an auditory sensation.

(24) Sound Level

"Sound Level" is the A-weighted sound pressure level.

(25) Sound Level Meter

A "sound level meter" is an instrument, that is sensitive to and calibrated for the measurement of sound.

(26) Sound Pressure

The "sound pressure" is the instantaneous difference between the actual pressure and the average or barometric pressure at a given location. The unit of measurement is a micropascal (μPa) which is the same as a micronewton per square metre ($\mu\text{N}/\text{m}^2$).

(27) Sound Pressure Level

The "sound pressure level" is twenty times the logarithm to the base 10 of the ratio of the effective pressure (p) of a sound to the reference pressure (p_r) of $20 \mu\text{Pa}$. Thus the sound pressure level in dB = $20 \log_{10} \frac{p}{p_r}$.

(28) Tone or Narrow Band of Energy

A "tone" or "narrow band of energy" is any sound which can be distinctly identified through the sensation of pitch.

(29) Vibration

"Vibration" is a temporal and spatial oscillation of displacement, velocity or acceleration in a solid medium.

(30) Vibration Velocity Detector

A "Vibration Velocity Detector" is a device which is capable of measuring vibration velocity and which meets the applicable specifications of Publication NPC-112 - Instrumentation, for Vibration Velocity Detectors.

Publication NPC-102 - Certificate

1. Scope

This Publication sets out the minimum requirements for granting a Certificate of Competency in Environmental Acoustics Technology.

2. Certification

A Certificate of the specified class shall be issued by the Minister to any person who has satisfactorily completed the following approved training courses in Environmental Acoustics Technology.:

<u>Certificate Class</u>	<u>Training Courses</u>
1	Acoustics I and II
2	Acoustics I, II, and III
3	Acoustics I, II, III and IV

3. Exemptions

Persons having successfully completed mathematics and physics courses at a level one year beyond Grade 13 or two years beyond Grade 12 shall be deemed to have satisfactorily completed Acoustics I. The Minister may, in his sole discretion, grant further or other exemptions.

4. Certificate Renewal

Each certificate issued by the Minister shall expire three years from the date of issue. The certificate will be reissued for a further three year period on successful completion of the appropriate refresher course approved by the Minister.

5. Other Courses

For purposes of Certification of a Noise Control Officer, courses in acoustics offered by other teaching institutions may be approved by the Minister where they cover the subject matter set out in section 6 below.

6. Curriculum

Acoustics I

Introductory Acoustic Theory. Law. Handling of complaints. Use of simple sound level meter, octave band analyser and calibration techniques. Measurement of traffic noise and industrial noise. Procedures. Examination.

Acoustics II

Review of Acoustics I. Theory. Law; E.P.A., By-Law. Complaint statistics. Investigations, report writing. National and international standards. Use of 1/3 octave analyser, tape recorder, impulse SLM. Audiometrics, personal hearing test. Field work. Examination.

Acoustics III

Review of Acoustics II. Theory. Law, stop orders, control orders, provincial officer's report, prosecutions, graphic analyser, statistical analyser. Vibration analysis. Advanced stationary source noise analysis. Laboratory. Field work. Examination.

Acoustics IV

Review of Acoustics III. Theory. Use of statistical analyser, digital monitor, dosimeter, real time analyser. Off road and road side measurements. Location of, acoustical evaluation and legal documentation of test sites. Law. Advanced procedures. Selection of instrumentation. Examination.

7. Audiometric Test

Candidates for their first Certificate and for any reissue of a Certificate shall submit to a binaural audiometric test. Test results shall in every case be disclosed to the candidate and to the sponsoring employer.

8. Training Manuals

Training manuals in "Environmental Acoustics Technology" are available as separate documents from the Ontario Government Bookstore, 880 Bay Street, Toronto.

PUBLICATION NPC-103Procedures1. Scope

This Publication comprises the various measurement procedures to be used in connection with those other Publications which require the measurement of sound or vibration.

Several of the procedures are those of nationally or internationally recognized agencies. They have been adopted by the Ministry.

2. Technical Definitions

The technical words used in a procedure shall have the meanings given either in that procedure or in Publication NPC-101 - Technical Definitions.

3. Procedure for Measurement at a Point of Reception

(1) Application

This procedure applies to measurements of continuous or intermittent sound which either does not vary widely in level or which is always higher than the permissible level and which is to be measured at a point of reception on residential premises.

(2) Instrumentation

(a) Sound Level Meter

A sound level meter shall be used which is appropriate for the type of sound to be measured:

(i) General Sounds

For general sounds without audible impulsive character such as, but not limited to, sounds due to low pressure air handling equipment, muffled internal combustion engines, or air compression equipment with muffled inlet and exhaust, a General Purpose Sound Level Meter shall be used.

(ii) Impulsive, Quasi-Steady Impulsive and Buzzing Sounds

For sounds which exhibit:

- impulsive character such as, but not limited to, gunshots, drop forges or hammering;
- quasi-steady impulsive character such as, but not limited to pavement breakers, riveting guns, ineffectively muffled internal combustion engines or ineffectively muffled air compressors;
- buzzing character such as, but not limited to, positive displacement blowers, chain saws, miniature internal combustion engines or ineffectively muffled lawn mower gasoline engines;

an Impulse Sound Level Meter shall be used.

(b) Calibrator

An Acoustic Calibrator shall be used.

(c) Windscreen

A windscreen shall be used which meets the appropriate specification of Publication NPC-112 - Instrumentation.

(3) Measurement Location(a) Air-Borne Sound

For sound transmitted to the receptor solely through the air, the measurement location shall be one of the following points of reception, not on the property of the source:

- (i) a location out-of-doors where a person may be exposed to the sound;
- (ii) the plane of the window or exterior door of a room, in which a person may be exposed to the sound, where the door or window is open;
- (iii) a balcony, patio or similar amenity where a person may be exposed to the sound.

(b) Ground-Transmitted Sound

For sound which is radiated to the interior of a residence due to energy transmitted from the source, predominantly via the ground and the structure of the residence, the measurement shall be taken in the interior of the residence.

(4) Use of Instrumentation(a) Battery Check

The condition of the sound level meter battery shall be checked after the meter has been allowed to warm up and stabilize. The battery condition shall be rechecked at least once per hour during a series of measurements and at the conclusion of such measurements. The meter shall not be used unless the battery condition is confirmed to be within the range recommended by the manufacturer for proper operation.

(b) Calibration

The sound level meter shall be calibrated after every battery check.

(c) Sound Level Meter Settings

Measurements shall be taken using the following response settings:

(i) Slow - A- Weighted dBA

For all sounds other than impulsive sound, measurements shall be taken using the slow response and the A-weighting.

(ii) Impulsive Sounds dBAI

For impulsive sound, measurements of the impulse sound level shall be taken using the impulse response and the A-weighting. If available on the meter, an 'impulse hold' facility may be used in measuring single-event impulsive sounds.

(d) Instrument Configuration(i) Reflective Surfaces

The microphone shall be located not less than 1 m above the ground, not less than 1 m from any acoustically reflective surface except for the purposes of sub-clause (3)(a)(ii) above, and not less than arm's length from the body of the person operating the meter. For the case of (3)(a)(ii) above, the microphone shall be in the middle of the aperture located not less than 15 cm from the window frame or door frame. Not more than one person, other than the operator of the meter, shall be within 7 m of the microphone and that person shall be behind the operator of the meter.

(ii) Microphone Orientation

The microphone shall be oriented such that the sound to be measured is incident at an angle recommended by the microphone manufacturer for flattest frequency response in a free field.

(e) Readings(i) Readings Taken - Continuous Sounds

For continuous or intermittent sounds including buzzing or quasi-steady impulsive sounds, a minimum of three measurements shall be taken with a minimum observation time of 15 s for each measurement. The observed average value for each of the three or more observations shall be noted as well as the range of sound levels during each observation period. For the purpose of calculating the equivalent sound level, the duration of the sound in any one hour shall be noted.

- (ii) Readings Reported - Continuous Sounds
For continuous or intermittent sounds the sound level reported shall be the arithmetic mean of the observed averages. If the range of three such averages is greater than 3 dBA, then the reading reported shall be the arithmetic mean of six observed averages. The value reported shall be given to the nearest 0.5 dBA.
- (iii) Readings Taken - Impulsive Sounds
For impulsive sounds of a randomly occurring or repetitive nature such that discrete readings can be made for each impulse, (i.e. the maximum excursion of the meter for the impulse) not less than six successive readings shall be noted.
- (iv) Readings Reported - Impulsive Sounds
For repetitive impulsive sounds the impulse sound level reported shall be the arithmetic mean of the readings. For single-event impulsive sounds the impulse sound level reported shall be that of the single event. The value reported shall be given to the nearest 0.5 dBAI.
- (v) Adjustments
Adjustments for tonality and/or intermittency shall be made in accordance with Publication NPC-120-Sound Level Adjustments.
- (vi) Wide Variation of Sound Levels - Continuous Sound
If, during the normal operation of a source of continuous or intermittent non-impulsive sound, buzzing sound or quasi-steady impulsive sound, the observed instantaneous sound level varies by more than 6 dBA then this Procedure shall not be used unless the lower limit of such variation is above the maximum permissible level. In such cases the procedure set out in section 4 - Procedure for Measurement of Randomly Occurring Sound at a Point of Reception, shall be used.
- (vii) Variation in Calibration
Measurements shall not be reported if the sound level meter calibration, after the measurements, is more than 0.5 dB different from that before the measurement.
- (viii) Battery Deterioration
Measurements shall not be reported if the battery condition after a measurement is not within the range recommended by the manufacturer for proper operation.

(f) Weather Conditions(i) Wind

Measurements shall not be taken unless the wind-induced sound level is more than 10 dBA below the measured levels. Reference should be made to Publication NPC-112-Instrumentation.

(ii) Humidity

Measurements shall not be taken if the relative humidity is above the maximum for which the meter specification is guaranteed by the manufacturer (normally 90%).

(iii) Precipitation

Measurements shall not be taken during precipitation.

(iv) Temperature

Measurements shall not be taken when the air temperature is outside the range for which the meter specification is guaranteed by the manufacturer. (Normally, only the lower temperature limit is significant).

(5) Documentation

The following represents the minimum information which shall be contained in a report of an investigation where the above procedure was used. (Adapted from CSA Z107.2-1973 Methods for the Measurement of Sound Pressure Levels).

(a) Acoustic Environment

- (i) Location and description of sound sources.
- (ii) Dimensioned sketch including photographs, if possible, of the location of the sound source and the point of reception, showing all buildings, trees, structures and any other acoustically reflective surfaces.
- (iii) Physical and topographical description of the ground surface.
- (iv) Meteorological conditions prevailing at the time of the investigation including approximate local wind speed in km/h and direction, air temperature in °C and approximate relative humidity.

(b) Instrumentation

All the equipment used for making sound level measurements shall be listed, including:

- (i) type, model and serial number of sound level meter;
- (ii) type, model and serial number of microphone;
- (iii) type, model and serial number of Acoustic Calibrator;
- (iv) windscreen;
- (v) extension cables and additional amplifier, if used.

(c) Acoustical Data

The measurement details shall be described, including:

- (i) the locations and the orientation of the microphone, using a sketch if necessary;
- (ii) the sound levels obtained in dBA or dBAI, as appropriate, as described in clause (4)(e) above, preferably in tabular form, referencing location on a sketch or map;
- (iii) adjustments made for tonality or intermittency.
- (iv) details of any calculations;
- (v) comparison with applicable sound level limits or guidelines.

4. Procedure for Measurement of Randomly Occurring Sound at a Point of Reception

(1) Application

This procedure applies to measurements of sound which varies widely in level in a fashion which appears to be random, such that it is not consistently above a permissible level and which is to be measured at a point of reception on residential premises.

UNDER PREPARATION

5. Procedure for Measurement of Overpressure and Vibration
Due to Blasting Operations

(1) Application

This procedure applies to the measurement of overpressure (concussion) and vibration due to blasting operations at a point of reception on premises which are not located on the property where the blasting occurs.

(2) Overpressure

(a) Instrumentation

(i) Meter

A Peak Pressure Level Detector shall be used.

(ii) Calibrator

An Acoustic Calibrator shall be used.

(iii) Windscreen

A windscreen shall be used.

(b) Measurement Location

The measurement location shall be out-of-doors within 7 m of a building.

(c) Use of Instrumentation

(i) Battery Check

If the measuring device is battery powered, the condition of the battery shall be checked after the device has been allowed to warm up and stabilize and after each measurement has been made. The device shall not be used unless the battery condition is confirmed to be within the range recommended by the manufacturer for proper operation.

(ii) Calibration

The measuring device shall be calibrated after every battery check.

(iii) Meter Setting

The measuring device shall be set to read the peak overpressure using linear response and a 'hold' facility, if available.

(d) Instrument Configuration

(i) Reflective Surfaces

The microphone shall be located not less than 1 m above the ground, not less than 1 m from any acoustically reflective surface and not less than arm's length from the body of the person operating the device.

Not more than one person, other than the operator of the meter shall be within 7 m of the microphone and that person shall be behind the operator of the meter.

(ii) Microphone Orientation

The microphone shall be oriented such that the concussion wave to be measured is incident at an angle recommended by the microphone manufacturer for flattest frequency response in a free field.

(e) Readings

(i) Peak Overpressure Level

The value of peak overpressure level reported shall be given to the nearest 0.5 dB.

(ii) Variation in Calibration

Measurements shall not be reported if the meter calibration after the measurements is more than 0.5 dB different from that before the measurement.

(iii) Battery Deterioration

Measurements shall not be reported if the battery condition after the measurements is not within the range recommended by the manufacturer for proper operation.

(f) Weather Conditions

(i) Wind

Measurements shall not be reported unless the wind-induced sound level is more than 10 dB (linear) below the measured peak overpressure level. Reference should be made to Publication NPC-112 - Instrumentation.

(ii) Humidity

Measurements shall not be taken if the relative humidity is above the maximum for which the meter specification is guaranteed by the manufacturer (normally 90%).

(iii) Precipitation

Measurements shall not be taken during precipitation.

(iv) Temperature

Measurements shall not be taken when the air temperature is outside the range for which the meter specification is guaranteed by the manufacturer. (Normally only the lower temperature limit is significant).

(3) Vibration

(a) Instrumentation

(i) Meter

A Vibration Velocity Detector shall be employed.

(ii) Calibrator

Either an electrical reference signal of known voltage and frequency shall be used in the field for calibration of the whole system excluding the transducer or a reference vibration source shall be used for calibrating the whole system. Reference should be made to Publication NPC-112 - Instrumentation.

(b) Measurement Location

Vibration measurements shall be made inside a building below grade or less than 1m above grade, preferably on a basement floor close to an outside corner.

(c) Use of Instrumentation

(i) Battery Check

If the measuring device is battery powered, the condition of the battery shall be checked after the device has been allowed to warm up and stabilize, and after each measurement has been made. The device shall not be used unless the battery condition is confirmed to be within the range recommended by the manufacturer for proper operation.

(ii) Calibration

Field calibration shall be carried out before and after each measurement. Laboratory calibration of the whole system as used in the field, including the transducer, shall be carried out not less than once per calendar year.

(d) Instrument Configuration(i) Mounting

The transducer shall be attached to a part of the structure so as to prevent movement of the transducer relative to the structure.

(ii) Transducer Orientation

If three vector components of vibration velocity are recorded individually, it is preferable to orient the transducers such that the three axes of measurement are respectively (i) vertical, (ii) radial (along a horizontal line joining the place of the blast to the location of measurement), (iii) transverse (along a horizontal line at right angles to the line joining the place of the blast to the location of measurement).

(e) Readings(i) Peak Particle Velocity

The peak particle velocity in cm/s shall be reported.

(ii) Variation in Calibration

Measurements shall not be reported if calibration after the measurements is more than 5% different from that before the measurements.

(iii) Battery Deterioration

Measurements shall not be reported if the battery condition after the measurements is not within the range recommended by the manufacturer for proper operation.

(4) Documentation

The following represents the minimum information which shall be contained in a report of an investigation where the above procedure was used.

(a) Description of Area

(i) Location and description of blasting operation.

(ii) Dimensioned sketch including photographs, if possible, of the location of the blasting operation and the premises.

(iii) Physical and topographical description of the ground surface.

- (iv) Meteorological conditions at the time of the investigation, including approximate wind speed in km/h and direction, air temperature in degrees Celsius, approximate relative humidity, degree of cloud cover and whether or not a condition of thermal inversion prevailed.

(b) Instrumentation

All the equipment used for making overpressure and vibration measurements shall be listed, including:

- (i) type, model and serial number of Peak Pressure Level Detector.
- (ii) type, model and serial number of microphone;
- (iii) type, model and serial number of Acoustic Calibrator;
- (iv) windscreen;
- (v) extension cables and additional amplifiers, if used;
- (vi) type, model and serial number of Vibration Velocity Detector;
- (vii) type, model and serial number of transducers.

(c) Overpressure and Vibration Data

The measurement details shall be described, including:

- (i) the locations where measurements were taken and the orientation of instrumentation using a sketch, if necessary;
- (ii) the overpressure level in dB and/or vibration level in cm/s, preferably in tabular or graphic form;
- (iii) comparison with applicable overpressure and/or vibration limits or guidelines.

6. Exterior Sound Level Measurement Procedure For
Powered Mobile Construction Equipment - SAE J88a

SAE J88a Recommended Practice is adopted by the
Ministry with the following change:

Where ANSI Type 1 sound level meter specification
is referred to, reference shall be made instead to Publication
IEC-179 for Precision sound level meters.

7. MEMAC Test Code For the Measurement of Sound
From Pneumatic Equipment

THE MEMAC TEST CODE FOR THE MEASUREMENT OF SOUND
FROM PNEUMATIC EQUIPMENT is adopted by the Ministry with
the following additional requirement:

For measurement of percussive machines the sound level
meter used shall meet the specifications of IEC Publications
179 and 179A.

8. Exterior Sound Level Measurement Procedure For
Small Engine Powered Equipment - SAE J 1046

SAE J 1046 - Recommended Practice, is adopted by the Ministry with the following changes:

(1) Where ANSI Type 1 sound level meter specification is referred to, reference shall be made instead to IEC Publications 179 and 179A.

(2) Replace clause 3.1.1 with the following:

The minimum dimensions of the measurement zone are defined as a path of travel 1.2m wide by 14m long plus an adjacent triangular area having the base along the edge of the path of travel and the apex 7m from the midpoint of the base. See Figure 1a.

(3) Replace Fig. 1 with Fig. 1a on page 103-8.2.

(4) In section 3.3 Measurements, all references to 25 ft. shall be changed to 7 m.

Note: The above changes to SAE J 1046 are substantially as recommended in U.S. EPA report number 550/9-74-011, June 1974.

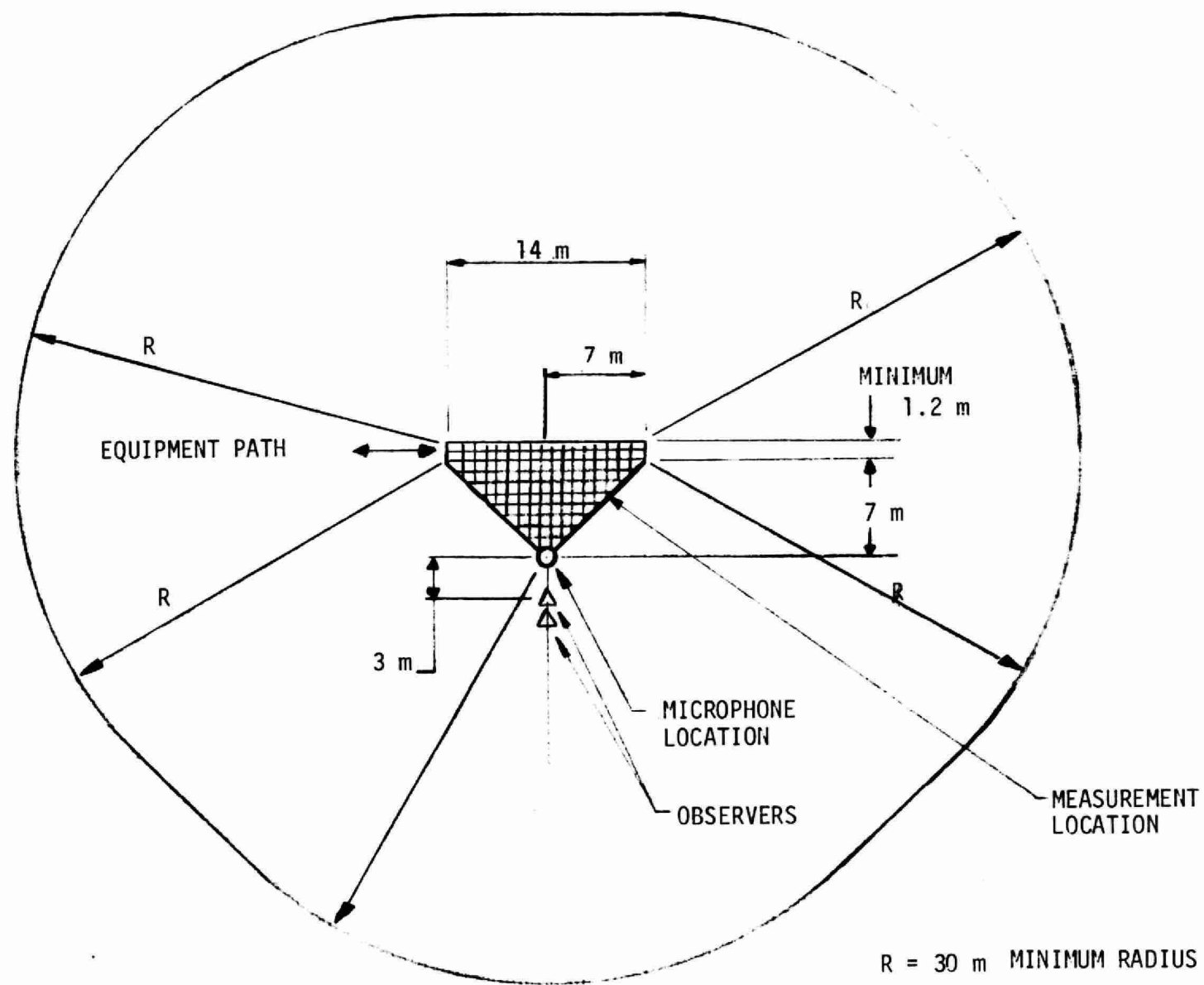


FIG. 1 a TEST SITE
REF. US EPA 550/9-74-011

9. Procedures for the Measurement of Exterior Sound Levels of Motorized Conveyances

Procedures for the measurement of exterior sound levels of motorized conveyances, including trucks, automobiles, motorcycles, recreational vehicles (trail-bikes, all terrain vehicles, snowmobiles) and power boats are under consideration as are the Publications specifying sound level limits.

Publication NPC-112Instrumentation1. Scope

This Publication sets out minimum specifications for equipment used for the measurement of sound and vibration. For most of the specifications, internationally or nationally accepted specifications have been adopted. In some cases, such specifications are amended or augmented for greater precision. For sound pressure measurements, the specifications are intended to limit the maximum error to ± 3 dB for any measurement carried out in accordance with Publication NPC-103 - Procedures. For vibration measurements, the specifications are intended to limit the maximum error to $\pm 20\%$, for any measurement carried out in accordance with Publication NPC-103 - Procedures.

2. Technical Definitions

The technical terms used in this Publication are defined in the specifications themselves or in Publication NPC-101 - Technical Definitions.

3. General Purpose Sound Level Meter(1) Purpose

A General Purpose Sound Level Meter is a sound level meter which is intended to be used for the measurement of non-impulsive sounds, without significant A-weighted acoustic energy above 2000 Hz.

(2) Specifications

A sound level meter which meets the following specifications is a General Purpose Sound Level Meter:

- (a) the sound level meter, including a microphone equipped with a windscreen shall meet the specifications of IEC 123, except that, in addition to meeting the specifications of subclause 5.2 thereof, the microphone of the sound level meter shall also meet the specifications of subclause 5.2 amended by the substitution therein of an angle of incidence of $\pm 30^\circ$ instead of $\pm 90^\circ$, as it therein appears, and by the substitution of Table 112-1 instead of Table 1, as it therein appears;

- (b) the sound level meter shall incorporate A-weighting, which is specified in IEC 123 as optional;
- (c) the sound level meter shall have a minimum usable range of sensitivity of from 45 dBA to 100 dBA and it shall read to an accuracy of ± 1.0 dB over that range;
- (d) the sound level meter, including a microphone equipped with a windscreen, shall, when operated in the presence of wind, indicate a wind-induced sound level not in excess of the relevant sound level listed in Table 112-2.

4. Impulse Sound Level Meter

(1) Purpose

An Impulse Sound Level Meter is a sound level meter which is intended to be used for the measurement of any sounds, including sounds for which a General Purpose Sound Level Meter may be used.

(2) Specifications

A sound level meter which meets the following specifications is an Impulse Sound Level Meter:

- (a) the sound level meter, including a microphone equipped with a windscreen, shall be a General Purpose Sound Level Meter;
- (b) the sound level meter, including a microphone equipped with a windscreen, shall meet the specifications of IEC 179 and IEC 179A, supplement to IEC 179, including the optional characteristics mentioned in subclause 4.5 of IEC 179A;
- (c) the microphone of the sound level meter, when equipped with a windscreen, shall perform within a tolerance of ± 1 dB throughout the frequency range of from 5 Hz to 31.5 Hz in the circumstances and conditions for use set out in Table 1 of IEC 179;
- (d) the sound level meter shall be capable of providing linear response as specified in subclause 4.5 of IEC 179, within a tolerance of ± 1 dB throughout the frequency range of 5 Hz to 15 kHz;

- (e) the sound level meter shall incorporate A-weighting as specified in IEC 179.

5. Peak Pressure Level Detector

(1) Purpose

A Peak Pressure Level Detector is a sound level meter which is intended to be used for the measurement of peak pressure perturbations of pressure pulses in air. The value indicated by this device is not an average of the pressure level perturbations.

(2) Specifications

A sound level meter which meets the following specifications is a Peak Pressure Level Detector (the features of this device are incorporated in an Impulse Sound Level Meter as specified in Section 4 above):

- (a) clause 4(2)(c) and 4(2)(d) above;
- (b) the optional characteristics specified in subclause 4.5 of IEC 179A;
- (c) the requirements set out in IEC 179 clause 3, subclauses 4.1, 4.2, 4.4, 4.5, 4.7, 4.8, clause 5, subclauses 6.2, 6.3, 6.4, 6.5, 6.8, 6.9, 7.1, through 7.9, 7.11, 8.1, 8.2, 8.3, 8.6 through 8.9, and the appropriate requirements of clause 10.

6. Acoustic Calibrator

(1) Purpose

An Acoustic Calibrator is an electro-mechanical or mechanical device which produces sound of a known frequency and which, when coupled to a sound level meter, will produce a predictable response in the sound level meter if the sound level meter is operating properly at the calibration frequency.

(2) Specifications

A device capable of producing sound which meets the following specifications is an Acoustic Calibrator:

- (a) the device shall produce sound of a stated frequency, within a frequency tolerance of $\pm 5\%$;
- (b) the device shall be capable of being physically attached to a sound level meter in such a way that the device and the sound level meter are "acoustically

coupled", that is, sound from the device is transmitted through the air by way of a chamber formed by the attachment of the device to the microphone of the sound level meter;

- (c) the manufacturer of the device shall provide with the device, any data required in order to obtain the sound level reading which should be indicated on the sound level meter when calibrated for free field measurements for those microphone and sound level meter types with which the manufacturer recommends the device be used. Where additional accessories must be used to provide the above sound level reading, the manufacturer shall state that they must be used;
- (d) the maximum tolerance in the sound pressure level generated by the device when coupled to the microphone shall apply over an atmospheric pressure range of 87 kPa to 107 kPa, and shall be ± 0.5 dB over the temperature range 0°C to 40°C and ± 1.0 dB over the temperature range -10°C to 50°C .
- (e) if the device is battery powered, means for checking the battery condition shall be included with the device;
- (f) the following data shall be provided with the device by the manufacturer.
 - (i) the nominal sound pressure level produced,
 - (ii) the nominal frequency at which the device operates,
 - (iii) the ranges of temperature and atmospheric pressure over which the device is intended to operate, and the applicable overall sound pressure level tolerance for these ranges.

7. Vibration Velocity Detector

(1) Purpose

A Vibration Velocity Detector is a device intended to be used for the measurement of the peak vibration velocity of a solid surface.

(2) Specifications

A device which meets the following specifications is a Vibration Velocity Detector:

- (a) the device shall include either a transducer which responds to the total vibration vector or three transducers which respond to components of the total vibration vector by resolving it along three axes which are mutually orthogonal $\pm 1^0$ and which coincide with the axis of maximum sensitivity of each of the three transducers respectively;
- (b) where three transducers are used to measure three mutually orthogonal components of vibration, then the response of any one of the transducers to vibration in the plane normal to its axis of maximum sensitivity shall be less than 10% of its response to the same vibration along its axis of maximum sensitivity;
- (c) the output of the device shall be proportional to the velocity of the surface on which the transducer is, or the transducers are, mounted and the output of the device shall be in such form that the device indicates or can be used to calculate the peak particle velocity in the frequency range of 5 Hz to 500 Hz over a range of peak particle velocity from 0.25 cm/s to 10 cm/s with an accuracy, depending on the frequency of vibration as shown in Table 112-3:
- (d) it shall be possible to field-calibrate the device with an accuracy of $\pm 5\%$ using either a reference electrical signal in series with the equivalent transducer impedance or a reference vibration source.

8. Integrating Sound Level Meter

(1) Purpose

An Integrating Sound Level Meter is a device which is intended to be used for the measurement of sound over a period of time, such that the equivalent sound level of the sound may be obtained.

UNDER PREPARATION

TABLE 112-1

Permissible Tolerances on Microphone Sensitivity
Over an Angle of $\pm 30^\circ$

Frequency Hz	Permissible Tolerances dB	
	A	B
31.5 - 500	± 1	± 1
1000	± 1	± 1
2000	± 2	+ 1 - 2
4000	± 4	+ 1 - 4
8000	± 10	+ 1 - 10

TABLE 112-2

Wind Screen Characteristics

Wind Speed	Maximum Wind-Induced A-Weighted Reading (dBA) Slow Response
15 km/h	41
20 km/h	48
25 km/h	53

TABLE 112-3

Frequency Response Limits of Velocity Measurements System

Frequency (Hz)	Tolerance %
0 - 5 Hz	+10 - ∞
5 Hz - 500 Hz	+10 - 10
500 Hz - ∞	+10 - ∞

Publication NPC-115Construction Equipment1. Scope

This Publication refers to sound emission standards for various items of construction equipment according to the date of manufacture of the equipment.

2. Technical Definitions

The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.

3. Sound Level Limits

Tables 115-1 to 115-3 inclusive list maximum residential sound emission standards and maximum quiet zone sound emission standards for specific items of construction equipment measured according to the procedures indicated.

4. Measurement Standards & Procedure

All measurements of sound to be made in connection with construction equipment shall be made in accordance with the procedures indicated in the Tables.

TABLE 115-1

Maximum Residential Sound Emission Standards for
Excavation Equipment, Dozers, Loaders Backhoes
or Other Equipment Capable of Being Used for
Similar Application

Maximum Sound Level as Determined Using SAE J88a(dBA at 15 m)		
<u>Date of Manufacture</u>	<u>Less than 125 kW</u>	<u>Greater than 125 kW</u>
After January 1st, 1976	85	88
After January 1st, 1980	83	85

TABLE 115-2

Maximum Sound Emission Standards for Pneumatic Pavement Breakers

Standard	Date of Manufacture	Maximum Sound Level as Measured Using MEMAC Test Code (dBA at 7 m)	
		Weight Greater than 32 Kg	Weight Less than 32 Kg
Quiet Zone Sound Emission Standard	All Units	85	85
Residential Sound Emission Standard	After January 1st 1976	89	85
	After January 1st 1980	85	85

TABLE 115-3

Maximum Sound Emission Standards for Portable Air Compressors

Standard	Date of Manufacture	Maximum Sound Level as Measured Using MEMAC Test Code (dBA at 7m)	
		Capacity Less than 10m ³ /min	Capacity Greater than 10m ³ /min
Quiet Zone Sound Emission Standard	Jan. 1st, 1976	75	75
	Jan. 1st, 1980	70	70
Residential Sound Emission Standard	After Jan. 1st 1976	75	80

Publication NPC-116Residential Air Conditioners1. Scope

This Publication refers to sound level limits and sound emission standards for residential air conditioning devices.

2. Definitions

The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.

3. Sound Level Limits

Table 116-1 lists the sound level limits for residential central air conditioning devices including but not limited to, split central, unitary central and heat pump installations, where the sound level is measured at a point of reception.

4. Sound Emission Standards

Table 116-2 lists maximum sound emission standards for window or through-the-wall air conditioners.

5. Measurement Standards & Procedures

All measurements of sound are to be made according to the Procedures indicated in the Tables.

TABLE 116-1

Sound Level Limits
For Central Air Conditioning Units

Date Effective	dBA	Measurement Procedure
After Jan. 1st, 1977	50	NPC-103 - Section 3 Procedure for Measurement at a Point of Reception
After Jan. 1st, 1980	45	

TABLE 116-2

UNDER PREPARATION

Publication NPC-117Domestic Outdoor Power Tools1. Scope

This Publication refers to sound emission standards for various domestic power tools which are normally used out-of-doors, according to the date of manufacture of the device.

2. Definitions

The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.

3. Sound Level Limits

Table 117-1 lists maximum sound emission standards for specific domestic outdoor power tools measured according to the procedures indicated.

4. Measurement Standards & Procedures

All measurements of sound to be made in connection with domestic outdoor power tools shall be made in accordance with the procedures indicated in the Tables which are set out in Publication NPC-103 - Procedures.

TABLE 117-1

Maximum Sound Emission Standards for Walk-Behind Powered
Lawn Mowers

Date of Manufacture	Maximum Sound Level as Measured Using the Modified SAEJ 1046 (dBA at 7 m) as set out in Publication NPC-103 Section 8
After Jan. 1st, 1977	73
After Jan. 1st 1980	69

Publication NPC-119Blasting1. Scope

This Publication refers to limits on sound (concussion) and vibration due to blasting operations.

2. Definitions

The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.

3. Concussion-Cautious Limit

Subject to section 4 the peak overpressure level limit for concussion resulting from blasting operations in a mine or quarry is 128 dB, measured at any point within 7 m of a building not located on the property where the blasting operation occurs.

4. Concussion-Peak Overpressure Level Limit

If the person in charge of a blasting operation carries out routine monitoring of the overpressure level, the peak overpressure level limit for concussion resulting from blasting operations in a mine or quarry is 136 dB, measured at any point within 7 m of a building not located on the property where the blasting operation occurs.

5. Vibration Cautious Limit

Subject to Section 6, the peak vibration velocity limit for vibration resulting from blasting operations is 1.25 cm/s peak particle velocity measured below grade or less than 1 m above grade in any part of a building not located on the property where the blasting occurs.

6. Peak Vibration Velocity Limit

If the person in charge of a blasting operation carries out routine monitoring of the vibration velocity, the peak vibration velocity limit for vibration resulting from blasting operations is 5.0 cm/s peak particle velocity measured below grade or less than 1 m above grade in any part of a building not located on the property where the blasting occurs.

7. Measurement Standards & Procedures

All measurements of overpressure level and vibration velocity shall be made in accordance with the "Procedure for Measurement of Overpressure and Vibration due to Blasting Operations" set out in Publication NPC-103 - Procedures.

PUBLICATION NPC-120Sound Level Adjustments1. Scope

This Publication refers to the adjustment of measured sound levels prior to comparison with the equivalent sound level limits specified in Schedule 4.

2. Definitions

The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.

3. Determination of Equivalent Sound Level (1 hour L_{eq})(1) Continuous or Intermittent Sound

The Equivalent Sound Level for continuous or intermittent sound, which either does not vary widely in level or which is always higher than the permissible level, for any continuous one hour is the sound level measured according to the Procedure for Measurement at a Point of Reception, set out in Publication NPC-103 - Procedures, Section 3, less an adjustment, determined from the following:

$$\text{Adjustment} = 10 \log_{10} \left(\frac{1}{x} \right)$$

where x is the fraction of an hour

for which the sound persists,

and which is approximated in Table 120-1.

(2) Random Sound

The Equivalent Sound Level of sound which varies widely in level in a fashion which appears to be random such that it is not consistently above a permissible level, for any continuous one hour shall be determined using the Procedure for Measurement of Randomly Occurring Sound at a Point of Reception, set out in Publication NPC-103 - Procedures, section 4.

4. Adjustment for Special Quality of Sound Measured According to 3(1)

(1) Tonality

If a sound has a pronounced audible tonal quality such as a whine, screech, buzz, or hum then 5 dBA shall be added to the measured value.

(2) Cyclic Variations

If a sound has an audible cyclic variation in sound level such as beating or other amplitude modulation then 5 dBA shall be added to the measured value.

(3) Quasi-Steady Impulsive Sound

Where a sound is of a repetitive impulsive nature so that a steady reading is obtained using the slow response, then 10 dBA shall be added to the measured value.

(4) One Adjustment Only

Adjustments may be made under one only of subsections (1), (2) or (3), providing that, if subsection (3) applies it shall be used in preference to subsections (1) or (2).

TABLE 120-1

Adjustment to be Subtracted from Measured Level of
Intermittent Sound to Derive Equivalent Sound Level
(Approximation to Exact Adjustment)

Duration of Sound In One Hour (Minutes)	Adjustment dBA
40 - 60	0
20 - 40	3
10 - 20	6
5 - 10	9
3 - 5	12
1 - 3	15
less than 1	20

PUBLICATION NPC-125Guidelines on the Duties of a Noise Control Officer1. Scope

This Publication suggests the duties which would be required of a Noise Control Officer, responsible for the enforcement of a by-law based on the Model Municipal Noise Control By-law.

2. Noise Control Officer

The person appointed as the Noise Control Officer will in most cases, as a municipal officer, have duties other than the enforcement of a noise control by-law. For enforcement of a qualitative type of by-law, no special technical training would be required. A presently employed by-law enforcement officer should be capable of performing this function.

For enforcement of a quantitative by-law, involving sound level measurements and/or an understanding of acoustical matters, the Noise Control Officer must possess a valid Certificate of Competency in Environmental Acoustics Technology. The following sections outline the duties which pertain principally to this type of Noise Control Officer.

3. Infrastructure

The Noise Control Officer will be responsible for setting up the administrative procedures which will permit the instituting of the by-law's provisions and for eventual enforcement. These procedures would include:

(a) Staff

engaging the services of such technical and/or investigative personnel as necessary,

(b) Instrumentation

purchasing and maintaining the sound-measuring instrumentation necessary for enforcement of the sound-level limit provisions of the by-law,

(c) Technical Procedures

determining the procedures necessary for the enforcement of the by-law, selected as applicable, from those set out in Publication NPC-103 - Procedures.

(d) Record Keeping

setting up a record-keeping system for all noise complaints, investigations and subsequent actions.

4. Enforcement

The Noise Control Officer will carry out, or supervise, investigations into noise complaints both of the qualitative type, and, if such provisions are included in the by-law, of the quantitative type where sound level measurements are necessary.

(1) Investigations

Details of any investigations carried out in enforcing the noise control by-law should be recorded including:

- (i) the names and addresses of the principals involved;
- (ii) the time and date of the alleged infraction of the by-law;
- (iii) the type of noise and applicable section of the by-law, if any;
- (iv) the sound level measurements made, including all the items specified in Publication NPC-103 - Procedures (a suggested format is shown in the Appendix); and
- (v) the Noise Control Officer's recommendations as to further actions;
- (vi) all subsequent events including the results of prosecutions.

(2) Applications for Exemption

The Noise Control Officer will be responsible for reviewing and examining the merits of any application made to Council for exemption from the provisions of the by-law.

(3) Reports

The Noise Control Officer will be required to report to Council, or a body appointed by Council, on several matters including:

(a) Complaints

presenting reports of investigations and explain recommendations,

(b) Exemptions

presenting his findings and recommendations on applications for exemption,

(c) Advice

providing such advice as Council requires for its deliberations on acoustical matters or noise control, and

(d) By-law Changes

recommending changes to the by-law so that it is not in conflict with related federal or provincial regulations and to advise Council of the substance of any additions or changes to the Publications.

5. Liason with Other Departments and the Ministry(1) Departments of the Municipality

The Noise Control Officer should endeavour to co-ordinate the efforts of all municipal employees to ensure that noise control is considered, where appropriate, in the performance of their duties.

This would entail keeping Municipal employees informed of Council's policies with respect to noise control and, generally, being available for consultation in matters related to sound and vibration.

(2) Communication with the Ministry

The Noise Control Officer should consult, whenever necessary, with the Noise Pollution Control Section of the Pollution Control Branch of the Ministry with respect to the enforcement of the by-law and any matter requiring specialized assistance.

A P P E N D I X N O . 1

Sample form to be inserted

Publication NPC-129Estimating Sound Levels from Ground Transportation1. Purpose

This Publication describes methods that may be used to estimate the one hour equivalent sound level at a point, caused by sound from ground transportation, in communities of over 10,000 people.

2. Scope

Generally, sound levels in the community are determined by sound from ground transportation. Regardless of the degree of control imposed on the sound from individual vehicles there will always be a certain irreducible background sound level in any built up area, caused primarily by ground transportation. Moreover:

- i) Most stationary sources, including major industries, do not produce sound in excess of that from ground transportation over much of a residential community.
- ii) Most complaints occur when an intruding sound is noticeably above this background sound level.

The techniques described herein allow an estimation of the one hour equivalent sound level at a point, caused by sound from ground transportation.

3. Definitions

- (1) The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.
- (2) Ground transportation includes all motorized conveyances which travel on highways or on rails.

4. Monitoring at the Point of Reception

Where the sound source under investigation may be turned off, the sound from ground transportation should be directly monitored at the point of reception, with the source turned off and observing the following:

- (a) The Procedure for Measurement of Randomly Occurring Sound at a Point of Reception set out in Publication NPC-103 - Procedures shall be employed.
- (b) A measurement period of at least twenty minutes is required.

(c) Monitoring may be carried out:

- (i) at any time when the source under investigation is turned off, but could ordinarily be expected to be turned on and be producing the same sound level as that measured during investigation of the source.
 - (ii) during any hour when traffic volumes of local traffic, highway traffic and rail traffic as described in Appendices 1, 2 and 3 respectively are within $\begin{smallmatrix} +50 \\ -30 \end{smallmatrix}$ % of the traffic volumes during the hour for which the equivalent sound level of the source under investigation is known.
- (d) Monitoring should not take place when sound from aircraft is dominant,
- (e) If aircraft operation is only occasional, the monitor should be inhibited whenever aircraft fly over.

5. Predictions

Prediction methods should be used whenever it is not possible to monitor the sound from ground transportation. Predictions should be based on observations made during a time period for which the equivalent sound level of the source under investigation is known.

(1) Local Traffic

Prediction of the one hour equivalent sound level due to local traffic should be made using the techniques described in Appendix 1. This prediction applies to all roads with a speed limit less than or equal to 65 km/h and a traffic volume, as described in the Appendix, of less than 1500 vehicles per hour.

(2) Highways

Prediction of the one hour equivalent sound level due to highway traffic should be made using the techniques described in Appendix 2. This prediction may be used when the prediction method of subsection 5(1) cannot be applied.

(3) Railways

Prediction of the one hour equivalent sound level due to rail traffic should be made using the techniques described in Appendix 3.

APPENDIX 1Estimating Equivalent Sound Levels In
Areas Dominated by Sound From Local Traffic1. Scope

In general, traffic is the dominant noise source in residential communities.

Study of traffic noise in residential communities shows that:

- (i) Traffic volume on the road in front of a house usually determines the sound level in the front yard.
- (ii) The equivalent sound level (L_{eq}), varies little with time of day between 07 00 and 19 00. It also varies little along a block on a street.
- (iii) Equivalent sound levels (L_{eq}) in backyards are generally independent of front yard sound levels in built up areas and usually cluster around 50 dBA during the day.

These three conclusions provide a basis for the techniques outlined below. They are applicable in any community of over 10,000 people. Traffic volumes, as determined below, must be less than 1500 vehicles per hour. The speed limit on the road must be less than or equal to 65 km/h.

2. Procedures

Prediction of the equivalent sound level at a point of reception caused by sound from local traffic shall be made in accordance with the following:

Traffic Volume

- (a) Vehicles passing by on the road shall be counted for at least twenty minutes and the time interval employed shall be reported.
- (b) The traffic volume in vehicles/hour is the sum of,
 - (i) ten times the number of trucks and buses larger than vans or pickups, counted during the interval, and
 - (ii) the number of all other vehicles counted during the interval,divided by the length of the time interval as a fraction of an hour.

Equivalent Sound Level

- (c) Based on the traffic volume, the predicted equivalent sound level (L_{eq}) shall be obtained from Table 129-1.1.

Adjustment for Distance

- (d) Table 129-1.2 shall be used to correct the level obtained directly from Table 129-1.1 in order to obtain the predicted equivalent sound level (L_{eq}) for any outdoor point of reception along the full length of the block and at various distances from the centre of the road, unless any part of a building lies on the line joining the point of reception to the road.

Distance Measurement

- (e) The distance of the point of reception from the centre of the road shall be measured along the shortest line joining the point of reception to the centre of the road unless the point of reception is in the backyard of a house.

Backyards

- (f) If the point of reception is in the backyard of a house, the line joining the point of reception to a point on the centre of the road must pass through a gap, unobstructed by buildings, at least seven metres in width, and the distance of the point of reception from the centre of the road shall be measured along the shortest such line.

Sheltered Backyards

- (g) The predicted equivalent sound level (L_{eq}) for a point of reception in the backyard of a house shall be the level shown in Table 129-1.1 for a "sheltered backyard", in the following circumstances:
- (i) The backyard is separated from each nearby road by at least one row of buildings.
 - (ii) The traffic volume on any nearby road as determined in accordance with (a) and (b) does not exceed five hundred vehicles per hour.
 - (iii) The equivalent sound level cannot be predicted for the point of reception by means of clauses (a) to (f).

TABLE 129-1.1
ROADSIDE EQUIVALENT SOUND LEVEL

Traffic Volume (V)	L _{eq} (dBA)		
	Day (07 00-19 00)	Evening (19 00-24 00)	Night (00 00-07 00)
Vehicles Per Hour (1 truck or bus = 10 vehicles)			
Sheltered backyard	50	50	45
All other areas:			
$V \leq 20$	55	50	50
$V \leq 60$	55	55*	55*
$60 < V \leq 180$	60*	60*	60*
$180 < V \leq 500$	65*	65*	65*
$500 < V \leq 1500$	70*	70*	70*

* L_{eq} at 10m from the centre of the road.

TABLE 129-1.2
ADJUSTMENT FOR DISTANCE

Distance correction	**	Distance from the centre of the road D (m)
0 dB		$D \leq 20$
5 dB		$20 < D \leq 40$
10 dB		$40 < D \leq 80$
15 dB		$80 < D$

** Distance corrections cannot be used to reduce the levels in Table 129-1.1 below the levels shown in the second row of that table, i.e. for $V \leq 20$.

APPENDIX 2
Prediction Methods for Equivalent Sound Level
Due to Highway Traffic

Prediction methods for estimating the equivalent sound level due to highway traffic are being developed .

APPENDIX 3
Prediction of the Equivalent Sound Level
Due to Trains

This prediction method is under preparation.

Publication NPC-131Guidelines for Noise Control in Land Use Planning1. Scope

This Publication refers to the noise environment on the site of proposed residential or other sound-sensitive development in an urban area. Specified sound-level limits should apply to a new development as well as alteration to, or conversion of, any existing development or construction. Rural and special residential land use may be subject to different conditions. For sound-level limits on the site of a proposed residential or other sound-sensitive development influenced by aircraft noise, reference should be made to Publication NPC-126 - Guidelines on Aircraft Noise.

2. Definitions(1) Technical Definitions

The technical terms used in this Publication are defined in Publication NPC-101 - Technical Definitions.

(2) Definitions Specific to this Publication(a) Outdoor Recreational Areas

"Outdoor recreational areas" refers to those outdoor areas where the enjoyment of the outdoor environment is important. These areas include, but are not limited to, the following:

- (i) yards including front yards, backyards, gardens, terraces or patios of dwellings;
- (ii) common outdoor areas allocated for recreational purposes such as areas outside apartment buildings, condominiums, group homes, hospitals and schools;
- (iii) parks and open spaces allocated for recreational purposes within a plan of subdivision.

(b) Control Measures

"Control measures" refers to actions which can be taken to achieve noise compatibility for the specific land use or activity. Control measures may include, but are not limited to, the following:

- (i) Site Planning - orientation of buildings and outdoor recreational areas with respect to noise sources, spatial separation such as insertion of sound-insensitive land uses between source and receiver and appropriate setbacks;
- (ii) Acoustical Barriers - berms, walls, favourable topographical features; other intervening structures;
- (iii) Architectural Design - room and corridor arrangement; blank walls, placement of windows, balconies and courtyards, building height;
- (iv) Construction - acoustical treatment of walls, ceilings, windows and doors, selection of acoustical materials and other control devices.

3. Indoor Sound Level Limits

- (1) Table 131-1 as adjusted in accordance with subsection (2), if necessary, gives the equivalent sound level (L_{eq}) limits and the applicable time periods for the indicated types of indoor space. These are the minimum requirements of these Guidelines and apply in all cases.
- (2) When the predominant sound has pronounced tonal quality such as a whine, screech, buzz, or hum or contains pronounced narrow bands of energy, then 5 dBA should be deducted from the sound level limits indicated in Table 131-1.

4. Outdoor Sound Level Limits

- (1) Table 131-2 gives the sound level limits for two descriptors, the 50th percentile sound level (L_{50}) and the equivalent sound level (L_{eq}) for outdoor recreational areas, where the descriptors are referenced to the entire 16 hour period from 07:00 to 23:00 hours. The 50th percentile need only be considered for developments where the predominant sound is industry or a highway producing near constant sound levels.

Compliance with these sound level limits should

generally ensure compliance with the appropriate requirements of Table 131-1 for the same time period for any normal building construction nearby.

- (2) Table 131-3 gives the sound level limits for two descriptors, the 50th percentile sound level (L_{50}) and the equivalent sound level (L_{eq}), for outdoor areas, in the vicinity of buildings or proposed buildings containing sleeping quarters, where the descriptors are referenced to the entire 8 hour period from 23:00 to 07:00 hours. The 50th percentile need only be considered for developments where the predominant sound is industry or a highway producing near constant sound levels.

Compliance with these sound level limits should generally ensure compliance with the appropriate requirements of Table 131-1 for the same time period for any normal building construction nearby.

- (3) Where the requirements of Table 131-3 cannot be met, special architectural design or construction features will have to be incorporated into the building construction to ensure compliance with the appropriate requirements of Table 131-1 for the same time period.

5. Planning the Project

(1) Responsibility of Developer

The developer or proponent of a new project, or project to convert an existing use, for a residential or sound-sensitive development in an urban area, should be responsible for investigating both the outdoor and potential indoor acoustical environments, and to determine the feasibility and the constraints applicable before any project action is taken or construction commitment made.

(2) Establishing the Sound Levels On- Site

The sound levels anticipated on the site should be established by the use of prediction techniques acceptable to the Minister, based when necessary on actual measurements. In all cases, consideration should be given to anticipated future increases in sound levels for at least ten years.

(3) Control Measures

When anticipated sound levels on the site of the land use development under consideration, exceed the recommended sound level limits, the land developer should institute appropriate control measures or revision to plans.

(4) Ventilation

When special architectural design or construction features are used as control measures and thereby restrict indoor ventilation, then air conditioning or forced air ventilation systems should be provided.

Table 131-1
Indoor Sound Level Limits

Type of Space	Equivalent Sound Level (L_{eq}), dBA
Bedrooms, sleeping quarters, hospitals, etc. (Time period 23:00-07:00 hours)	40
Living rooms, hotels, motels, etc. (Time period 07:00-23:00 hours)	45
Individual or semi-private offices, small conference rooms, reading rooms, classrooms, etc. (Time period 07:00-23:00 hours)	45
General offices, reception areas, retail shops and stores, etc. (Time period 07:00-23:00 hours)	50

Table 131-2
Sound Level Limits for Outdoor
Recreational Areas (07:00-23:00 hours)

Sound Descriptor for the Entire Period	Sound Level Limit, dBA
L_{50}	52
L_{eq}	55

Table 131-3
Sound Level Limits for Outdoor
Areas (23:00-07:00 hours)

Sound Descriptor for the Entire Period	Sound Level Limit, dBA
L_{50}	47
L_{eq}	50

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